DOT-HS-805-450

COST EVALUATION FOR EDERAL MOTOR VEHICLE SAFETY STANDARDS

TASK IX SIDE DOOR STRENGTH, IDENTIFICATION AND COST EVALUATION OF DESIGN AND MANUFACTURING CHANGES

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16. Abstract

The contractor reviewed the price evaluation of FMVSS 214 performed under Contract No. DOT-HS-7-01767 and selected fourteen commensurate 1979 models and door beams and body pillars (if necessary). The components required were purchased and a weight and consumer price was obtained by the application and automotive component processing. Variable cost was determined by the application of 1979 model year production data. The consumer price was determined by extending the variable cost by the macro-analysis method based on data from 1978. The changes were categorized either by (1) improvement by engineering and/or manufacturing changes or (2) by sizing changes. Four 1979 models didnot change, four were redesigned for engineering and manufacturing reasons, and four were downsized and two were upsized.

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METRIC CONVERSION FACTORS

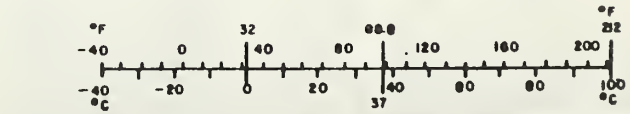
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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FMVSS 214, SIDE DOOR STRENGTH, IDENTIFICATION AND PRICE EVALUATION OF DESIGN AND MANUFACTURING CHANGES

The contractor reviewed the cost evaluation study performed under contract No. DOT-HS-7-01767 to determine the 1979 models that were commensurate with 1973 models previously studied for consumer price and weight changes necessary to meet the requirements of FMVSS 214. The models are listed in Table 1 along with remarks as to the comparison of the 1979 model with the 1973 model.

TABLE 1

COMPARISON OF 1973 AND 1979 VEHICLE MODELS
FMVSS 214 SIDE DOOR STRENGTH

MANUFACTURER	1973 MODEL STUDIED	COMMENSURATE 1979 MODEL	REMARKS
AMERICAN MOTORS	GREMLIN 2 DOOR	SPIRIT 2 DOOR	INTRODUCED 1979
CHRYSLER	VALIANT 2 DOOR	VOLARE 2 DOOR	INTRODUCED 1976
	FURY HT 4 DOOR	-	DISCONTINUED 1979
FORD	PINTO 2 DOOR	PINTO 2 DOOR	NO MAJOR CHANGES
	TORINO 2 DOOR	LTD II 2 DOOR	REVISED 1977
	MAVERICK 4 DOOR	FAIRMONT 4 DOOR	INTRODUCED 1978
	GALAXIE 4 DOOR	LTD 4 DOOR	DOWNSIZED 1979
GENERAL MOTORS	NOVA 2 DOOR	NOVA 2 DOOR	NO MAJOR CHANGES

TABLE 1
(CONTINUED)

COMPARISON OF 1973 AND 1979 VEHICLE MODELS
FMVSS 214 SIDE DOOR STRENGTH

MANUFACTURER	1973 MODEL STUDIED	COMMENSURATE 1979 MODEL	REMARKS
GENERAL MOTORS	CAMARO 2 DOOR	CAMARO 2 DOOR	NO MAJOR CHANGES
	MONTE CARLO 2 DOOR	MONTE CARLO 2 DOOR	DOWNSIZED 1978
	MALIBU HT 2 DOOR		DISCONTINUED 1974
	CAPRICE 4 DOOR	CAPRICE 4 DOOR	DOWNSIZED 1977
	TORONADO 2 DOOR	TORONADO 2 DOOR	DOWNSIZED 1979
	OLDS 98 HT 4 DOOR		DISCONTINUED 1977
TOYOTA	CELICA 2 DOOR	CELICA 2 DOOR	REVISED 1976
	CORONA 4 DOOR	CORONA 4 DOOR	REVISED 1974 & 1979
	BEETLE 2 DOOR	RABBIT 2 DOOR	NEW MODEL 1975

It can be noted in Table 1 that the Fury HT, the Malibu and the Oldsmobile 98 4 Door HT no longer existed in 1979 and no commensary vehicle could be selected for this study.

The 1973 American Motors Gremlin, the Chrysler Valiant, the Ford Maverick, and the Volkswagen Beetle had been supplanted by different, but similar models by 1979.

The Ford Torino and both Toyota models had been revised between 1973 and 1979. The Ford LTD, the General Motors Monte Carlo, Caprice, and Toronado had been downsized by 1979. Three models, the Ford Pinto, and the General Motors Nova and Camaro had been essentially unchanged during the period.

A consumer price and weight study has been made for the fourteen models indicated and a summary of the variance between the 1973 and 1979 model is present in Table 2. The cost data is based on 1979 model production year economics and 1978 macro-analysis data. The Monte Carlo is the only model from the basic study that required pillars. The 1979 weight and price study of the Monte Carlo includes the body pillars.

Appendix A provides photographs of the components included in the study. During the processing of the components, notations were made by the process engineers that will describe the variance in data between models. A summary of these comments follows:

AMC 1973 Gremlin (Photo A-3) and 1979 Spirit (Photo A-4)

1973 Gremlin Weight 33.38 pounds Consumer Price $25.10
1979 Spirit Weight 33.38 pounds Consumer Price $25.10

Both designs, size and weight relating to the implementation of this standard were identical. No changes existed between these models.

CHRYSLER 1973 Valiant (Photo A-5) and 1979 Volare (Photo A-6)

1973 Valiant Weight 21.00 pounds Consumer Price $17.96
1979 Volare Weight 22.20 pounds Consumer Price $17.33

TABLE 2

SUMMARY OF WEIGHT AND CONSUMER PRICE VARIANCE ON FMVSS 214 SPECIMENS

MANUFACTURER	1973	1979	CHANGE CATEGORY ENGINEERING DESIGN	CHANGE CATEGORY SIZE	VARIANCE IN WEIGHT (POUNDS) FROM 1973 MODEL	VARIANCE IN CONSUMER PRICE ($) FROM 1973 MODEL
AMERICAN MOTORS	GREMLIN 2 DR	SPIRIT 2 DR	N/C	N/C	N/C	N/C
CHRYSLER	VALIANT 2 DR	VOLARE 2 DR	X	-	+1.20	-.63
FORD	PINTO 2 DR	PINTO 2 DR	N/C	N/C	N/C	N/C
	TORINO 2 DR	LTD II 2 DR	X	-	-5.50	-2.71
	MAVERICK 4 DR	FAIRMONT 4 DR	X	-	-4.21	-.65
	GALAXIE 4 DR	LTD 4 DR	-	X	-12.62	-9.66
GENERAL MOTORS CHEVROLET	NOVA 2 DR	NOVA 2 DR	N/C	N/C	N/C	N/C
	CAMARO 2 DR	CAMARO 2 DR	N/C	N/C	N/C	N/C
	*MONTE CARLO 2DR	MONTE CARLO 2 DR	-	X	-39.17	-44.24
	CAPRICE 4 DR	CAPRICE 4 DR	-	X	-10.12	-4.86
GENERAL MOTORS OLDSMOBILE	TORONADO 2 DR	TORONADO 2 DR	-	X	+7.13	+2.65
TOYOTA	CELICA 2 DR	CELICA 2 DR	-	X	+5.63	+7.02
	CORONA 4 DR	CORONA 4 DR	X	-	-5.26	-1.93
VOLKSWAGEN	BEETLE 2 DR	RABBIT 2 DR	-	X	+5.74	+2.45

* Includes Pillars Per Original Study

The impact bar was identical in crossection for both vehicles, however, the Volare impact bar was 5 3/4 inches longer. The Volare design required only one mounting flange as compared to two for the Valiant. The net change in weight and consumer price was caused by a increase in impact bar material due to the length and a reduction of one mounting flange. Although there was a change in the models, the variance of weight and consumer price is charged as a design change.

FORD 1973 Pinto (Photo A-7) and 1979 Pinto (Photo A-8)

1973 Pinto Weight 24.42 pounds Consumer Price $19.07
1979 Pinto Weight 24.42 pounds Consumer Price $19.07

Both designs, size and weight relating to the implementation of this standard were identical. No changes existed between these models.

FORD 1973 Torino (Photo A-9) and 1979 LTDII (Photo A-10)

1979 Torino Weight 27.75 pounds Consumer Price $22.79
1979 LTD II Weight 22.25 pounds Consumer Price $20.07

Both designs relating to implementation of this standard were identical except a lighter gauge material was used for the LTD II impact bar and stiffener. This change is charged as a design change.

FORD 1973 Maverick (Photo A-11 and 12) and
1979 Fairmont (Photo A-13 and 14)

1973 Maverick Weight 25.79 pounds Consumer Price $26.52
1979 Fairmont Weight 21.58 pounds Consumer Price $25.87

A design change was made that reduced the number of components required. This resulted in a reduction in both weight and price of manufacturing of the 1979 components. The front doors of both models were approximately the same width. The rear door on the Fairmont was approximately three inches wider than the Mavericks'.

This change is charged as a design change.

FORD 1973 Galaxie (Photo A-15 and 16) and
1979 LTD (Photo A-17 and 18)

1973 Galaxie Weight 34.07 pounds Consumer Price $36.68
1979 LTD Weight 21.45 pounds Consumer Price $27.02

A design change was made that reduced the number of components required. The front and rear door widths were reduced two inches each in the LTD. The result was a reduction of both weight and consumer price of manufacturing 1979 components.

This change was caused by downsizing.

GENERAL MOTORS Chevrolet 1973 Nova (Photo A-19) and
1979 Nova (Photo A-20)

1973 Nova Weight 32.05 pounds Consumer Price $26.07
1979 Nova Weight 32.05 pounds Consumer Price $26.07

Both designs, size and weight relating to the implementation of this standard were identical.

No changes existed between these models.

GENERAL MOTORS Chevrolet 1973 Camaro (Photo A-21) and
1979 Camaro (Photo A-22)

1973 Camaro Weight 41.25 pounds Consumer Price $28.30
1979 Camaro Weight 41.25 pounds Consumer Price $28.30

Both design, size and weight relating to the implementation of this standard were identical.

No changes existed between these models.

GENERAL MOTORS Chevrolet 1973 Monte Carlo (Photo A-23 and 25)
1979 Monte Carlo (Photo A-24 and 26)

1973 Monte Carlo Weight 92.65 pounds Consumer Price $103.69
1979 Monte Carlo Weight 53.48 pounds Consumer Price $59.45

The original study for the 1973 Monte Carlo included the body pillars, a requirement necessary to the implementation of this standard. These are illustrated in Photograph A-25. The weight and price data above for the 1973 and 1979 models includes pillar weight and consumer price. The door width was reduced approximately 1½ inches as a result of downsizing. The 1979 model has a reduction in size of the impact bar and number of manufactured components resulted in a substantial reduction in weight and consumer cost. The pillars were reduced approximately fifty percent in weight for 1973 to the 1979 model.

This change was a result of downsizing.

GENERAL MOTORS Chevrolet 1973 Caprice (Photo A-27 and 28)
1979 Caprice (Photo A-29 and 30)

1973 Caprice Weight 36.50 pounds Consumer Price $37.23
1979 Caprice Weight 26.38 pounds Consumer Price $32.37

The reduction of consumer price and weight is a result of the general downsizing of the Caprice. The 1979 model had a reduction of the front door impact system components from five to three and the rear door impact system from four to three. The 1979 front door width was reduced 1½ inches and the rear door width was reduced 2 inches. The net result of these changes was a reduction in weight and consumer price reduction due to less components required to be manufactured.

This change was basically due to downsizing.

GENERAL MOTORS Oldsmobile 1973 Toronado (Photo A-31)
1979 Toronado (Photo A-32)

1973 Toronado Weight 31.75 pounds Consumer Price $25.32
1979 Toronado Weight 38.88 pounds Consumer Price $27.97

The 1979 Toronado was a downsized vehicle compared to the 1973 model. However, the door was increased in width by approximately 5½ inches. The door impact system for the 1979 model was reduced from five to three components. The net result was an increase in material cost and a slight decrease in labor and variable burden to produce less parts.

This change was basically due to downsizing and resulted in a weight increase and a slight increase in consumer price.

TOYOTA 1973 Celica (Photo A-33) and 1979 Celica (Photo A-34)

1973 Celica Weight 29.75 pounds Consumer Price $21.34
1979 Celica Weight 35.38 pounds Consumer Price $28.36

The 1979 Celica is a larger model than the 1973 Celica, has a wider door, heavier impact bar with an additional component. The result was additional weight and an increase in consumer price due to added material and a component.

This change was due to an upsizing of the vehicle.

TOYOTA 1973 Corona (Photo A-35 and 36) and
1979 Corona (Photo A-37 and 38)

1973 Corona Weight 31.00 pounds Consumer Price $30.58
1979 Corona Weight 25.74 pounds Consumer Price $28.65

The total front and rear door widths are approximately the same for both models. A reduction of material resulted in both a weight and consumer price decrease.

This change was basically a result of design.

VW 1973 Beetle (Photo A-39) and 1979 Rabbit (Photo A-40)

1973 Beetle Weight 14.63 pounds Consumer Price $18.57
1979 Rabbit Weight 20.37 pounds Consumer Price $21.02

The 1979 Rabbit had nine inch wider door than the 1973 Beetle and had one additional component in the door impact system. The additional component and increased length of the impact bar resulted in added weight and consumer price.

The increase in weight and consumer price was a result of the specimen vehicle being larger.

CONCLUSION

Based on this study, four of the fourteen vehicles studied previously didnot change in design, weight or consumer price. Four models were redesigned for engineering or manufacturing reasons resulting in a consumer price reduction, and three of these models had a weight reduction. The exception was the Volare that due to a larger door size resulted in an increase in weight.

The six remaining models studied had a change in size, four were downsized and two were upsized. Of the four downsized models, three resulted in a reduction of weight and consumer price. The other downsized model, the Toronado, had an increase in the door size that resulted in additional weight and consumer price.

The two upsized models resulted in an increase in weight and consumer price.

APPENDIX A

COMPONENTS RELATING TO THE IMPLEMENTATION OF FMVSS 214

LIST OF PHOTOGRAPHS

1973 AMC GREMLIN 2 DOOR
FRONT DOOR BEAM

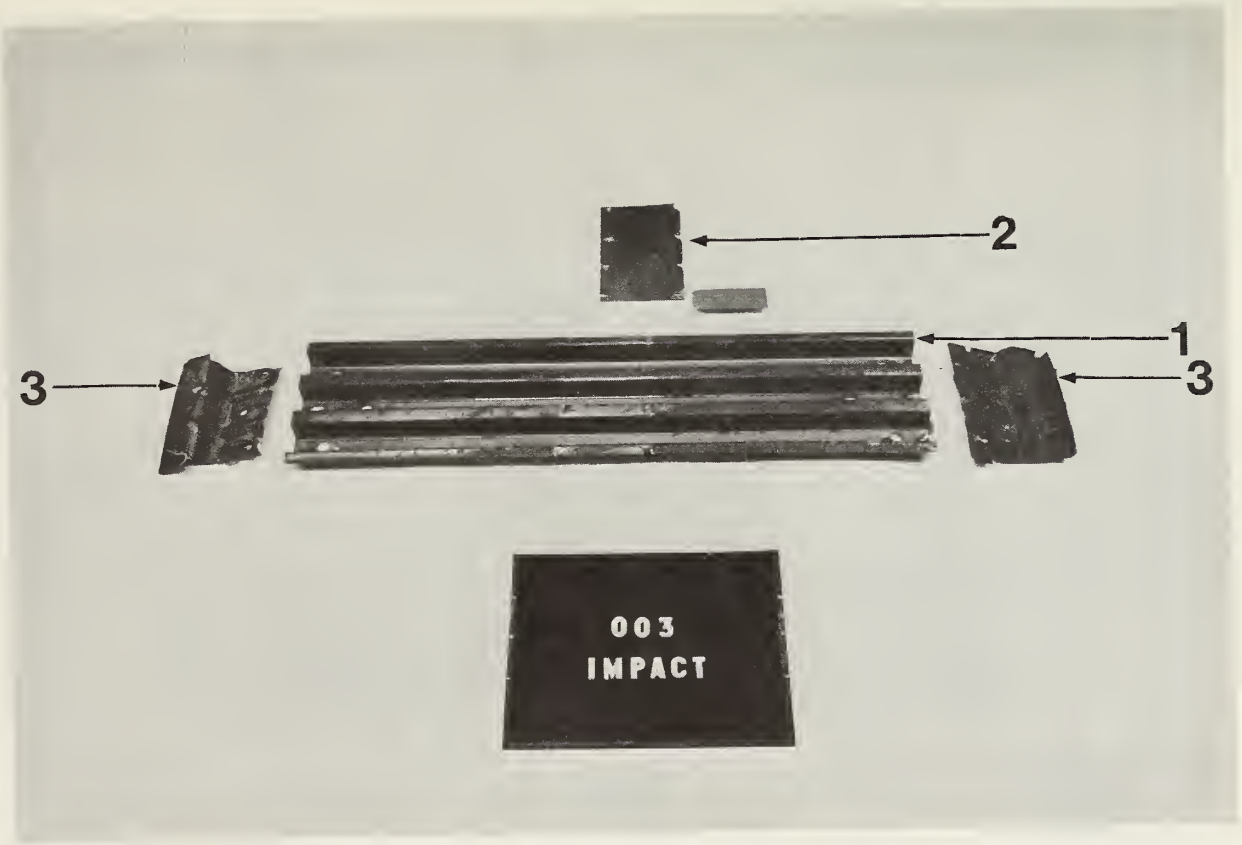
COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER

1979 AMC SPIRIT 2 DR
FRONT DOOR BEAM

COMPONENT CODE

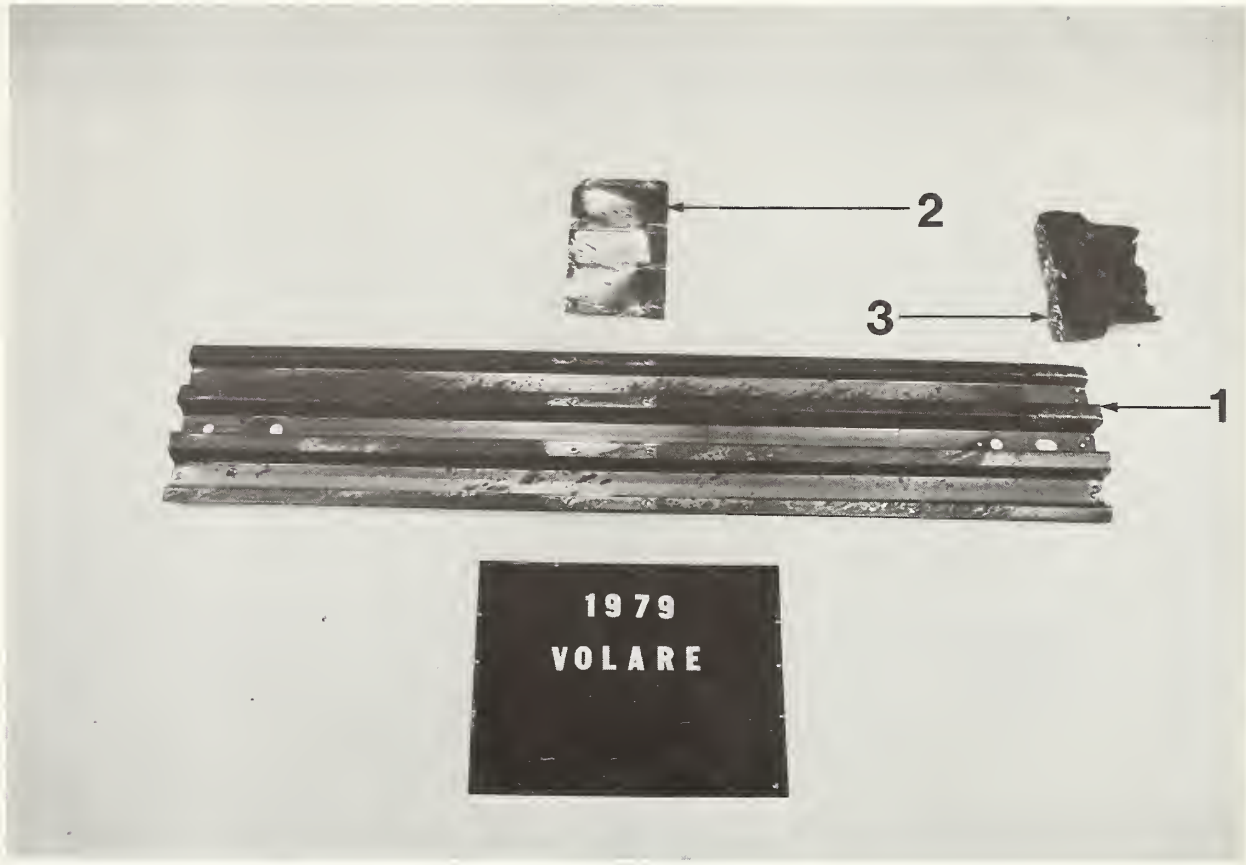
1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER



1973 CHRYSLER VALIANT 2 DOOR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR PLATE
3. IMPACT BAR MOUNTING FLANGE



1979 CHRYSLER VOLARE 2 DOOR
IMPACT BAR ASSY

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR PLATE
3. IMPACT BAR MOUNTING FLANGE

COMPONENT CODE

1. IMPACT BAR

1973 FORD PINTO 2 DOOR
FRONT DOOR BEAM

1979 FORD PINTO 2 DOOR
IMPACT BAR ASSY

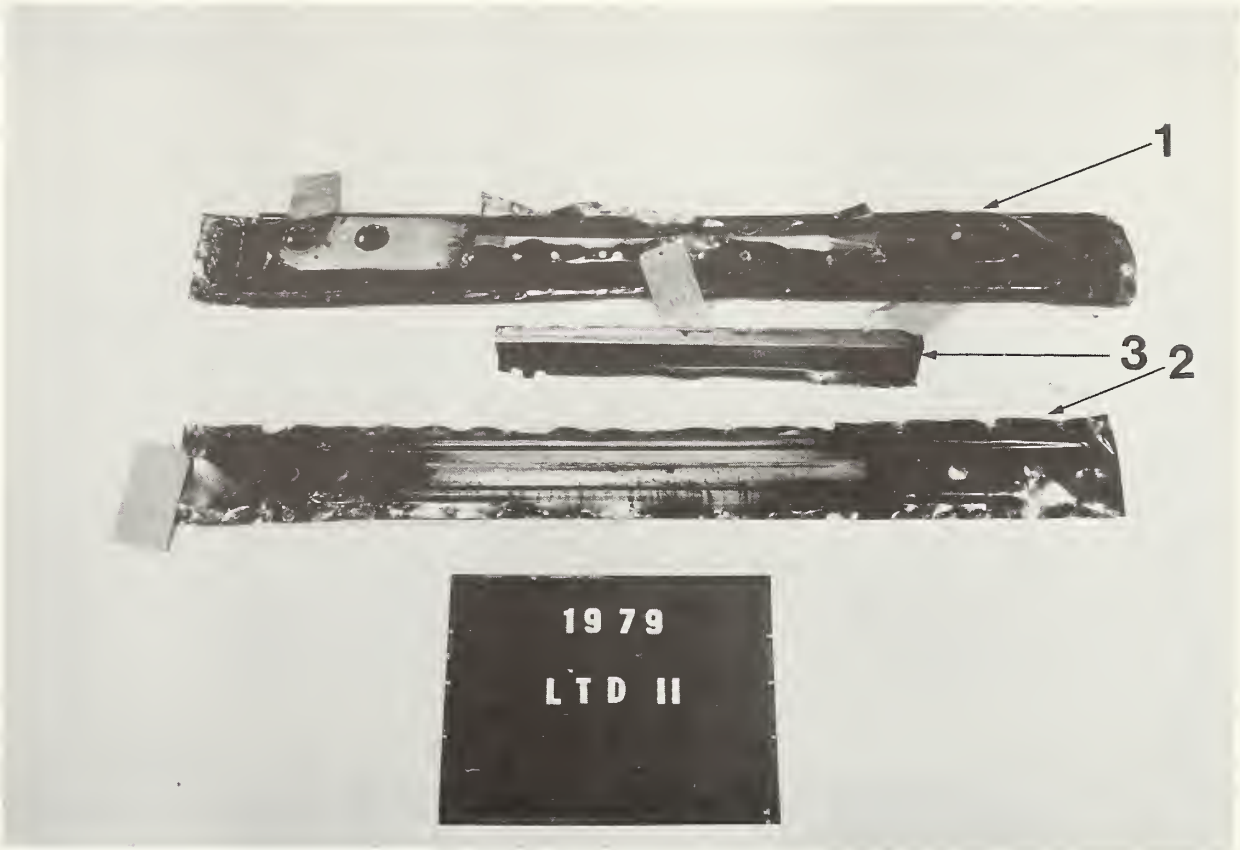
COMPONENT CODE

1. IMPACT BAR

1973 FORD TORINO 2 DOOR
FRONT DOOR BEAM

COMPONENT CODE

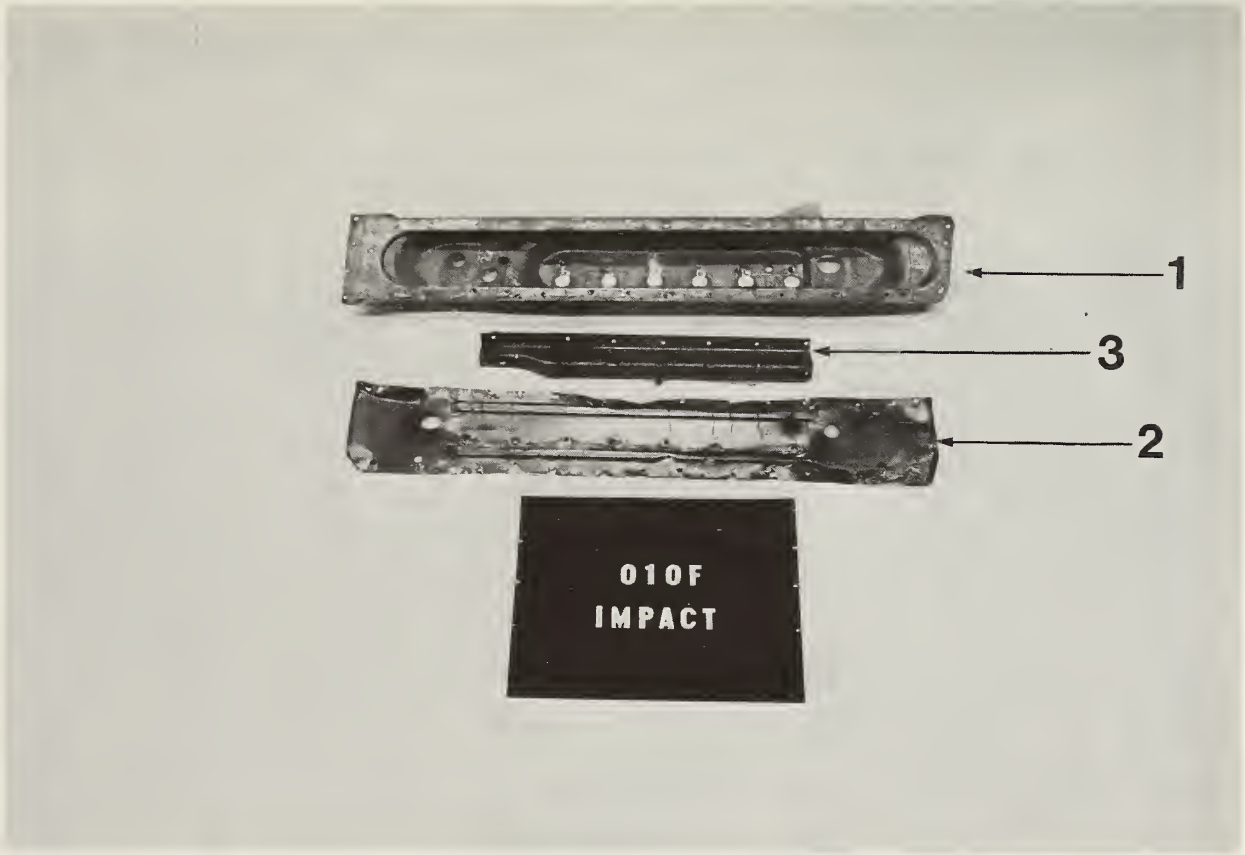
1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER



1979 FORD LTD II 2 DOOR
IMPACT BAR ASSY

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER



1973 FORD MAVERICK 4 DOOR
FRONT DOOR BEAM

COMPONENT CODE

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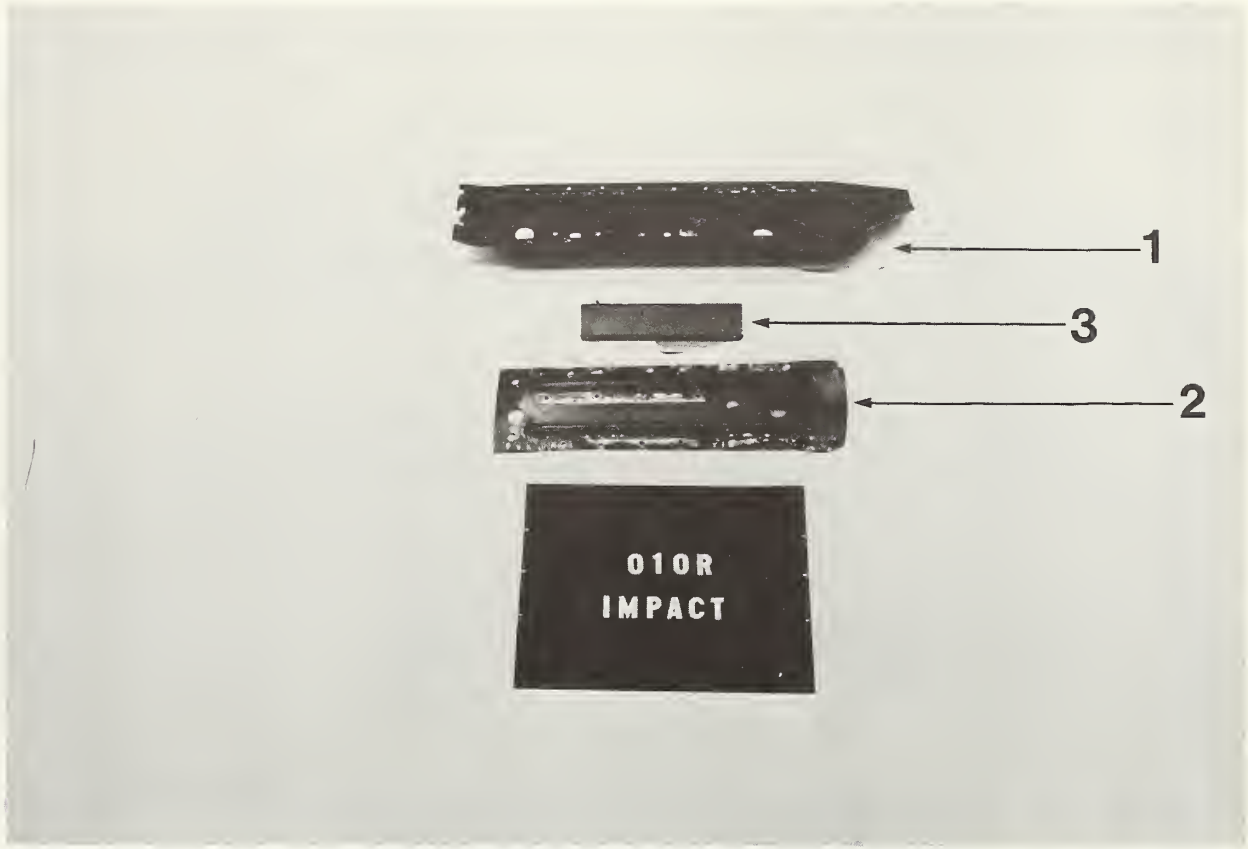
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER



1973 FORD MAVERICK 4 DOOR
REAR DOOR BEAM

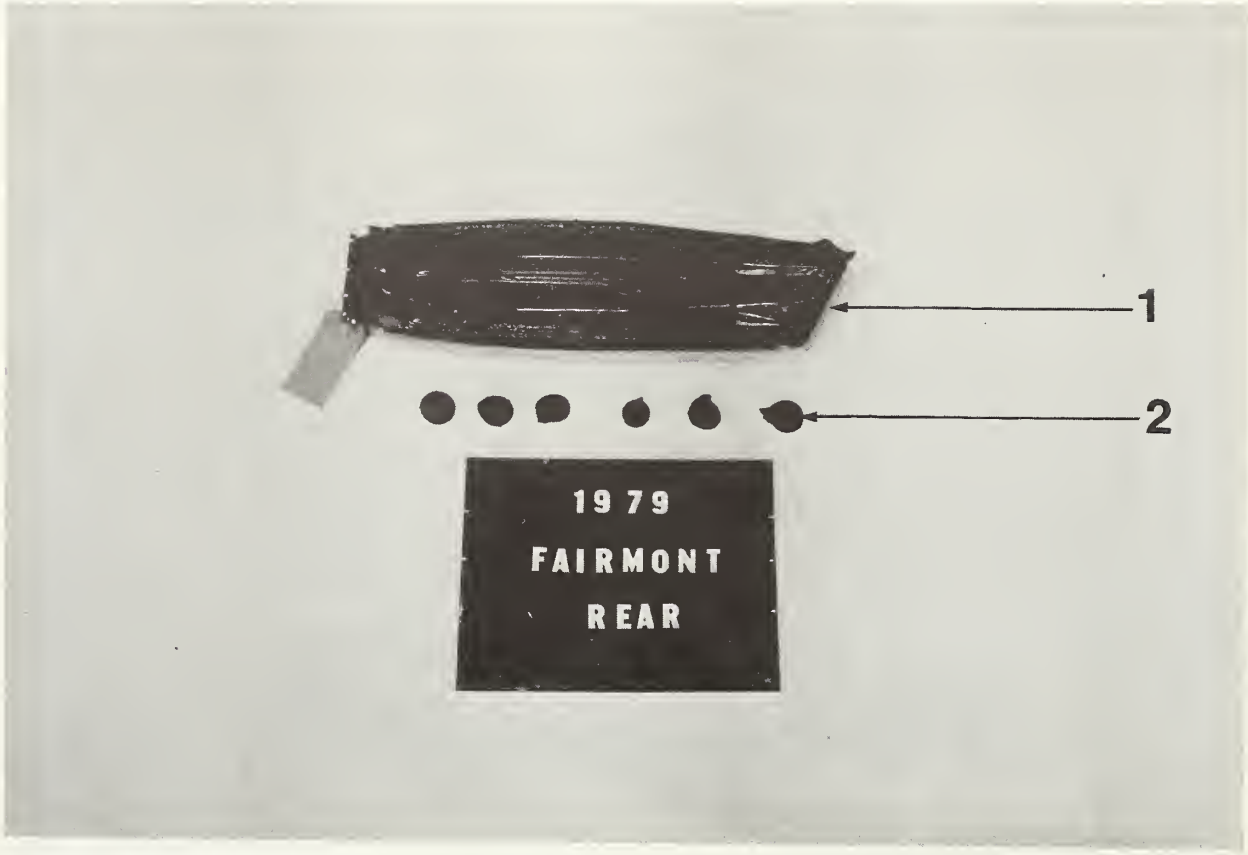
COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER

1979 FORD FAIRMONT 4 DOOR
FRONT DOOR
IMPACT BAR ASSY

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR PAD



1979 FORD FAIRMONT 4 DOOR
REAR DOOR
IMPACT BAR ASSY

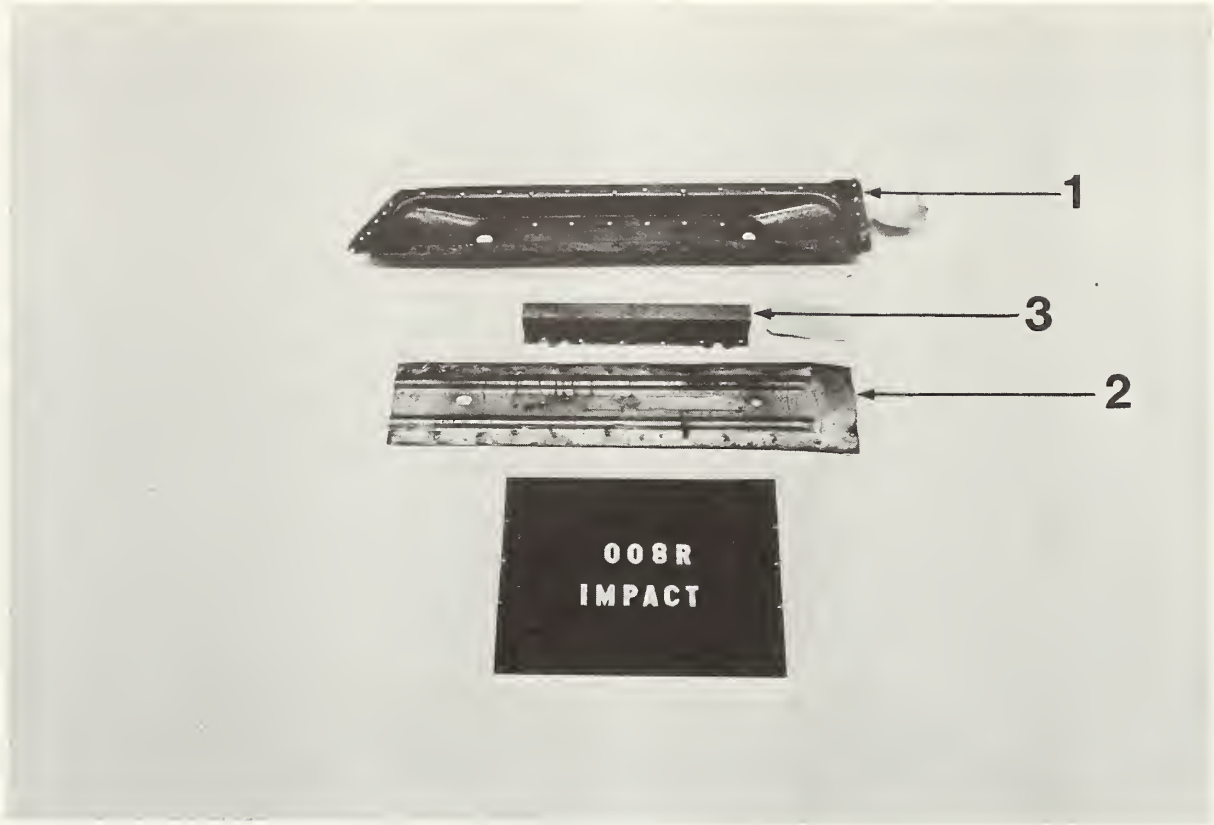
COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR PAD

1973 FORD GALAXIE 4 DOOR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER



1973 FORD GALAXIE 4 DOOR
REAR DOOR BEAM

COMPONENT CODE

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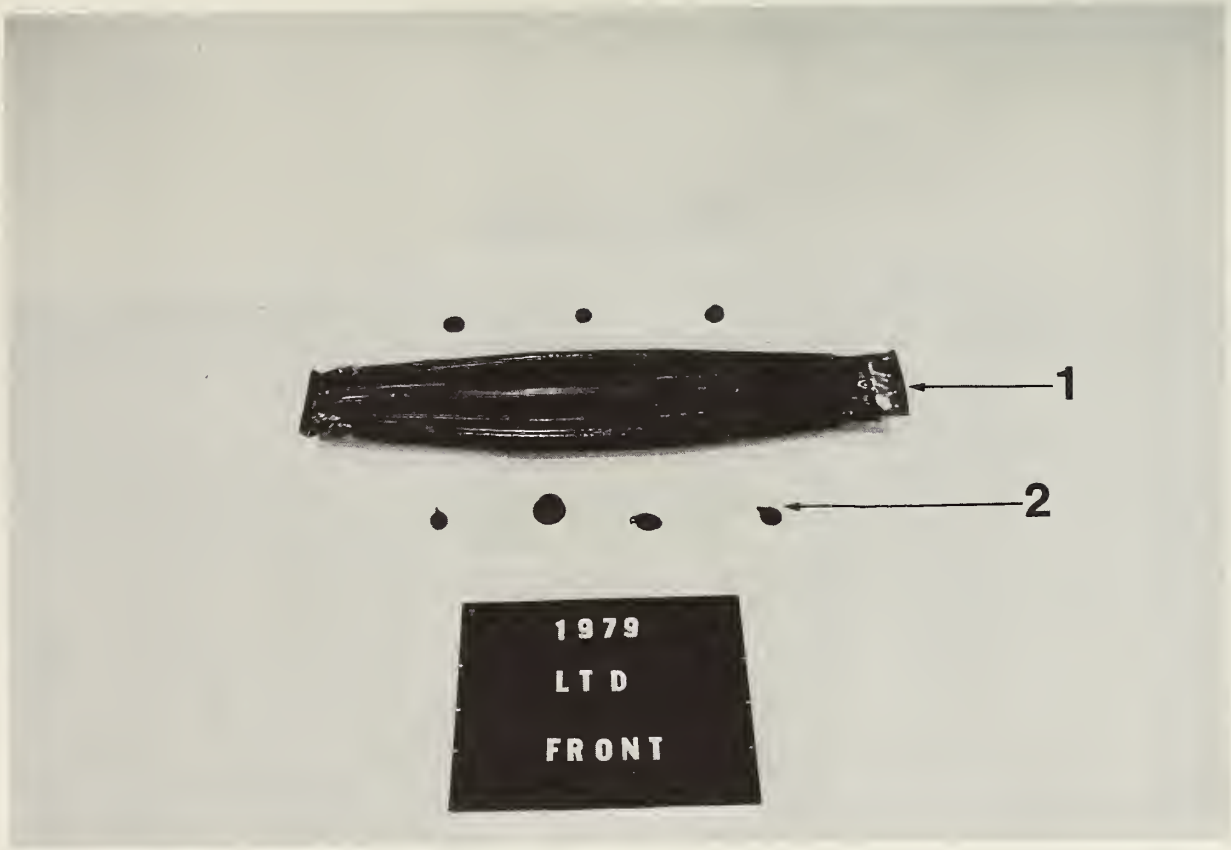
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER



1979 FORD LTD 4 DOOR
FRONT DOOR
IMPACT BAR ASSY

COMPONENT CODE

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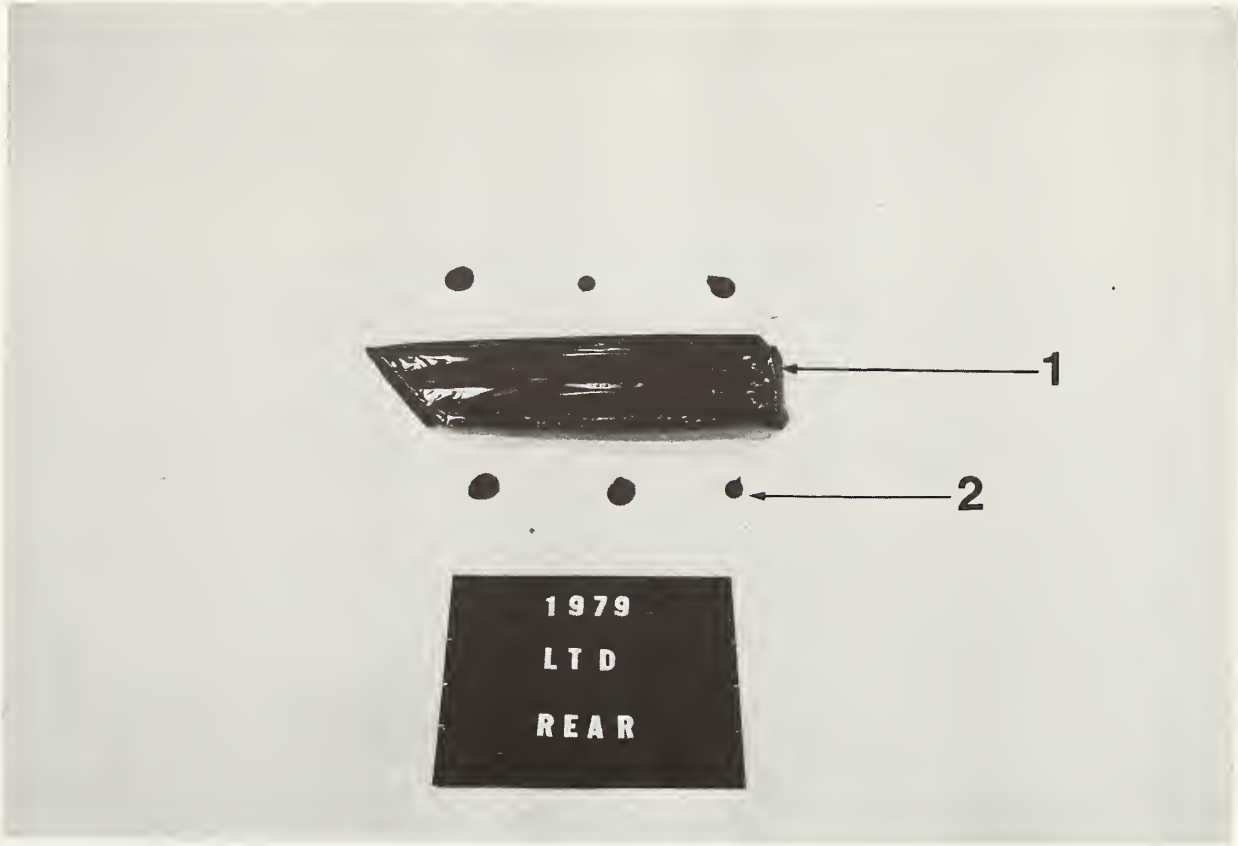
2. IMPACT BAR PAD



1979 FORD LTD 4 DOOR
REAR DOOR
IMPACT BAR ASSY

COMPONENT CODE

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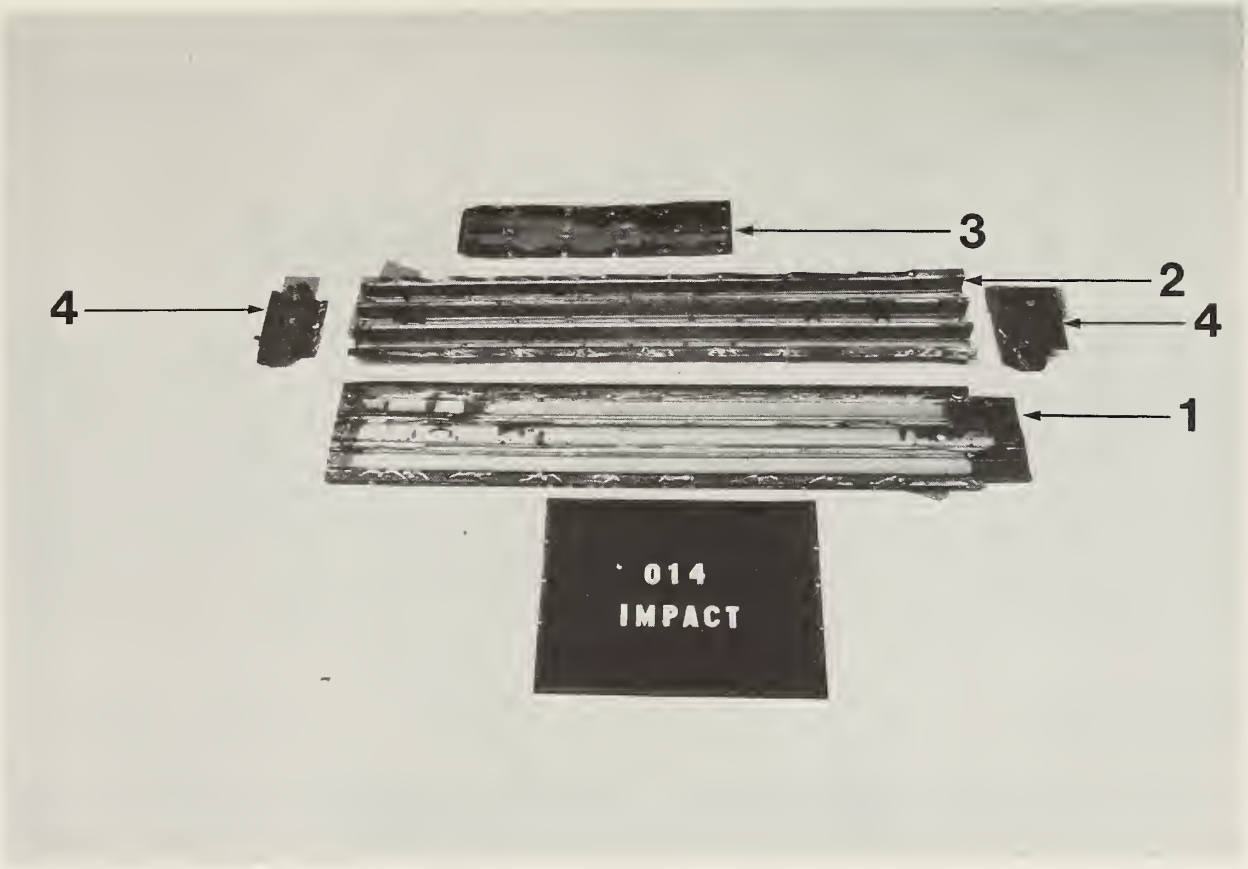
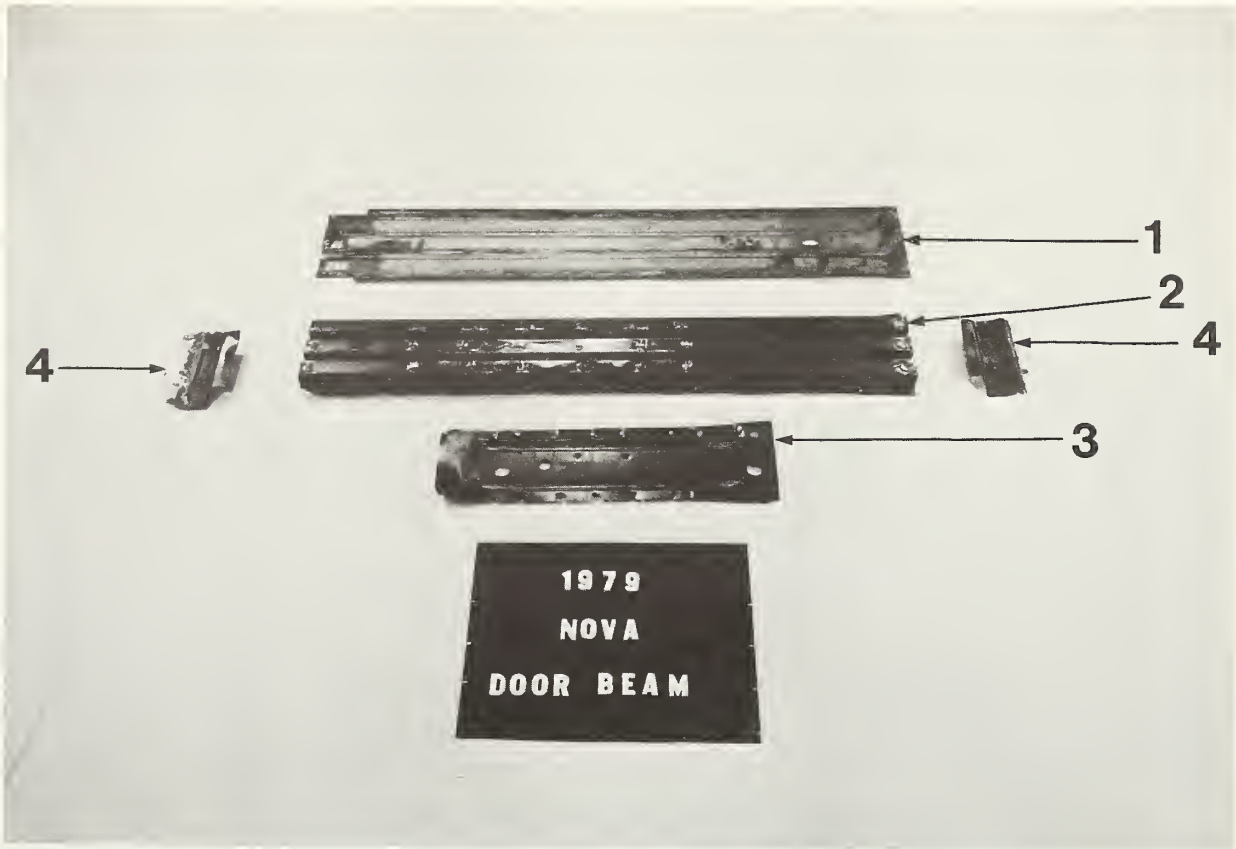
2. IMPACT BAR PAD



1973 GM CHEVROLET NOVA 2 DOOR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR PLATE
4. IMPACT BAR MOUNTING FLANGE



1979 GM CHEVROLET NOVA 2 DOOR
FRONT DOOR BEAM

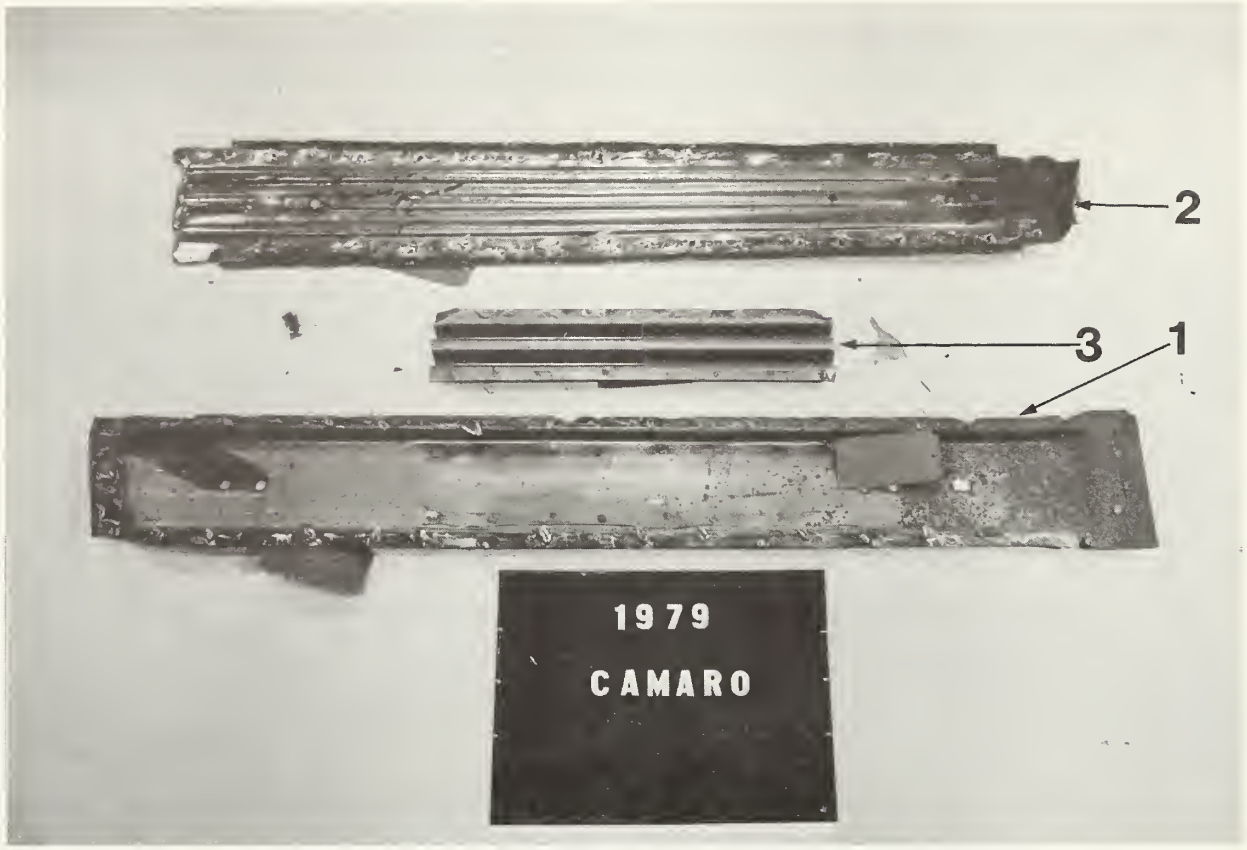
COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR COVER PLATE
4. IMPACT BAR MOUNTING FLANGE

1973 GM CHEVROLET CAMARO 2 DOOR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER



1979 GM CHEVROLET CAMARO 2 DOOR
FRONT DOOR BEAM

COMPONENT CODE

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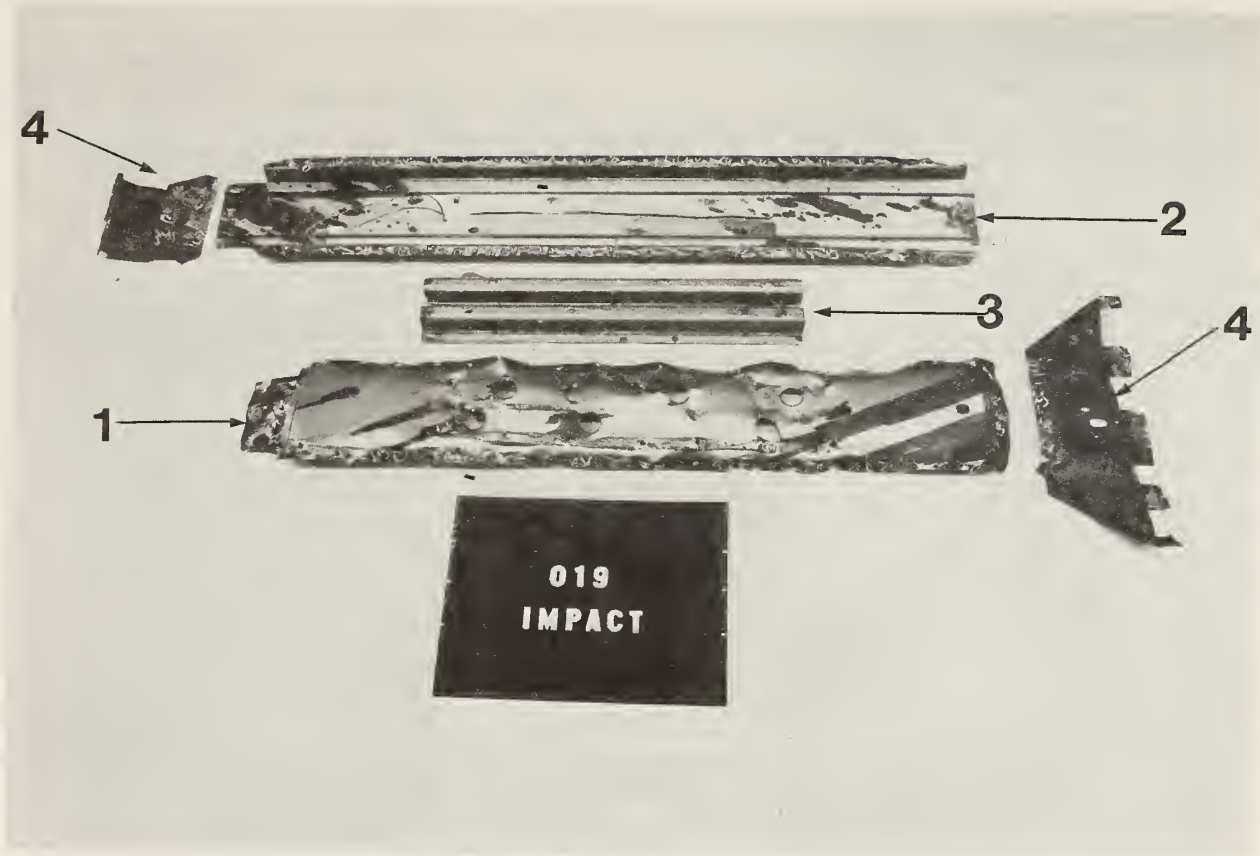
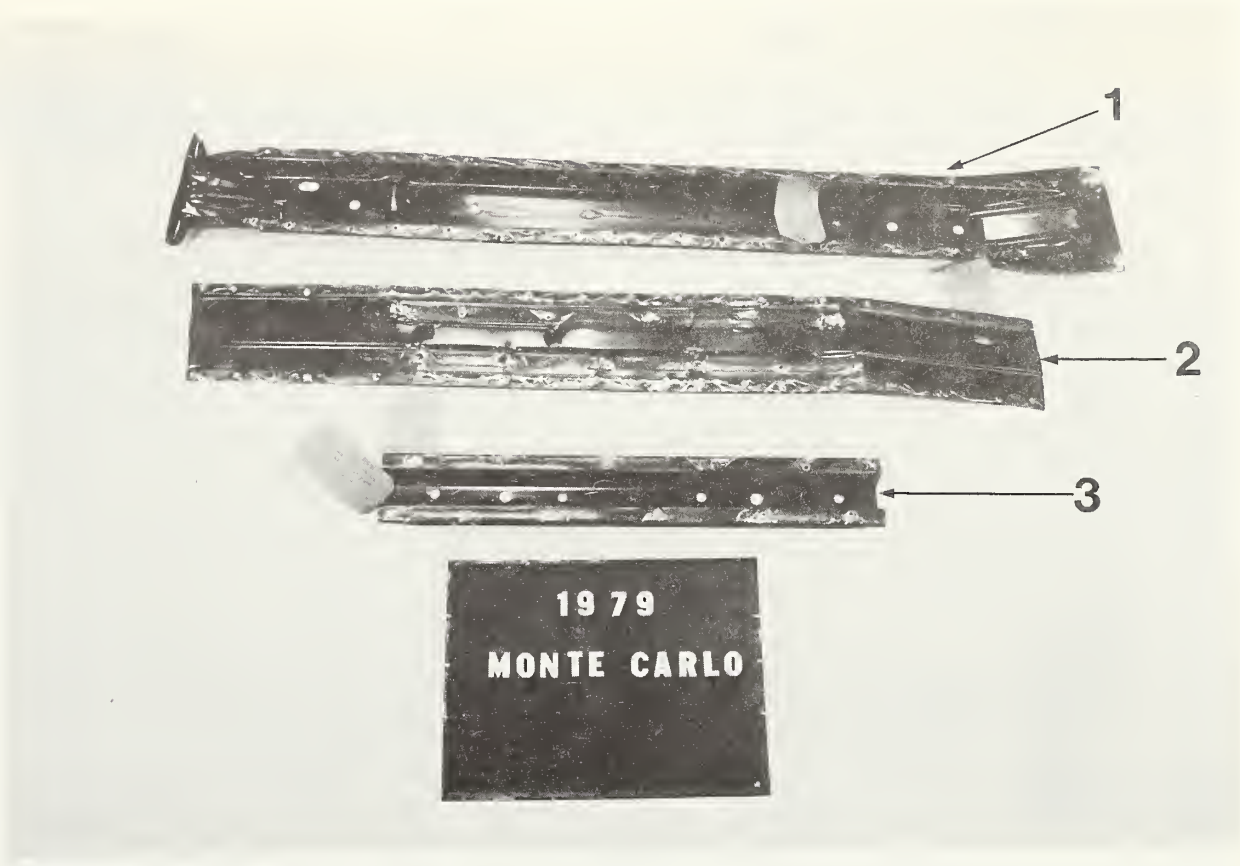
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER



1973 GM CHEVROLET MONTE CARLO 2 DOOR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER
4. IMPACT BAR MOUNTING FLANGE



1979 GM CHEVROLET MONTE CARLO 2 DOOR
IMPACT BAR ASSY

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER

1973 GM CHEVROLET MONTE CARLO 2 DOOR
FRONT HINGE PILLAR
REAR LOCK PILLAR

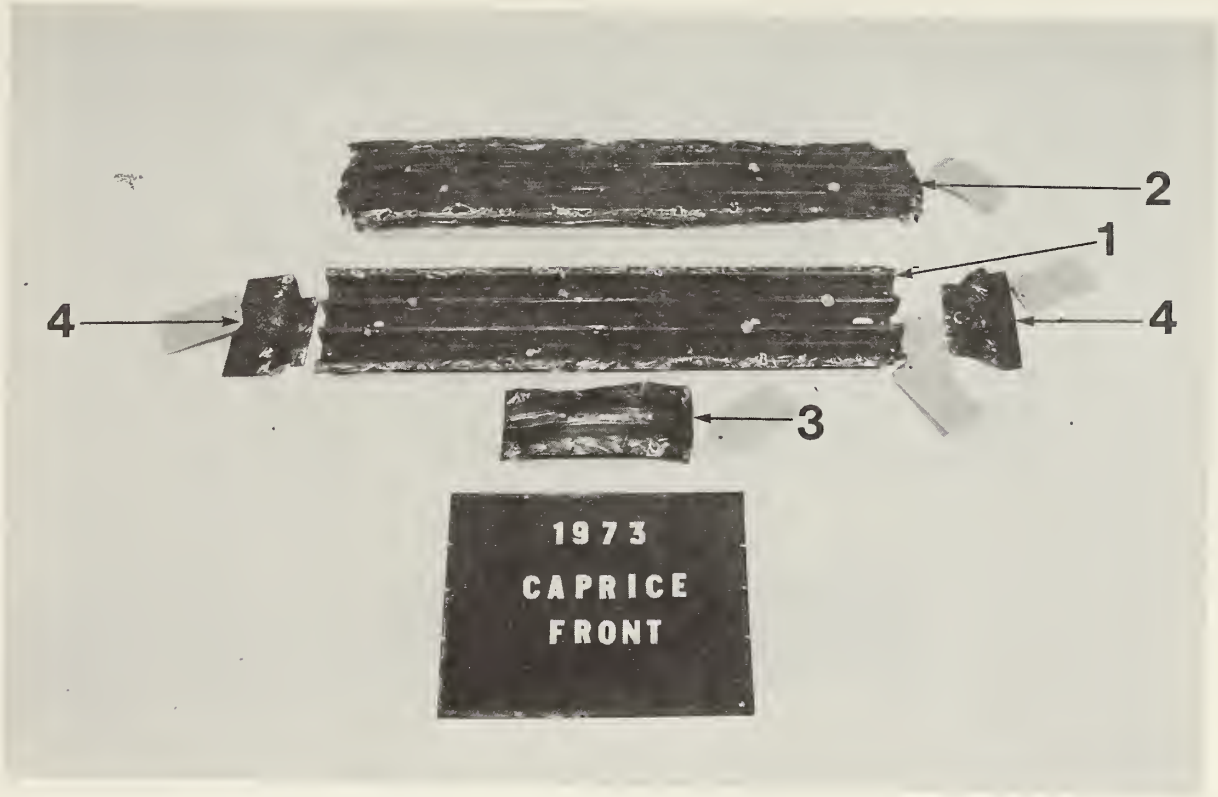
COMPONENT CODE

1. FRONT HINGE PILLAR
2. REAR LOCK PILLAR

1979 GM CHEVROLET MONTE CARLO 2 DOOR
FRONT HINGE PILLAR
REAR LOCK PILLAR

COMPONENT CODE

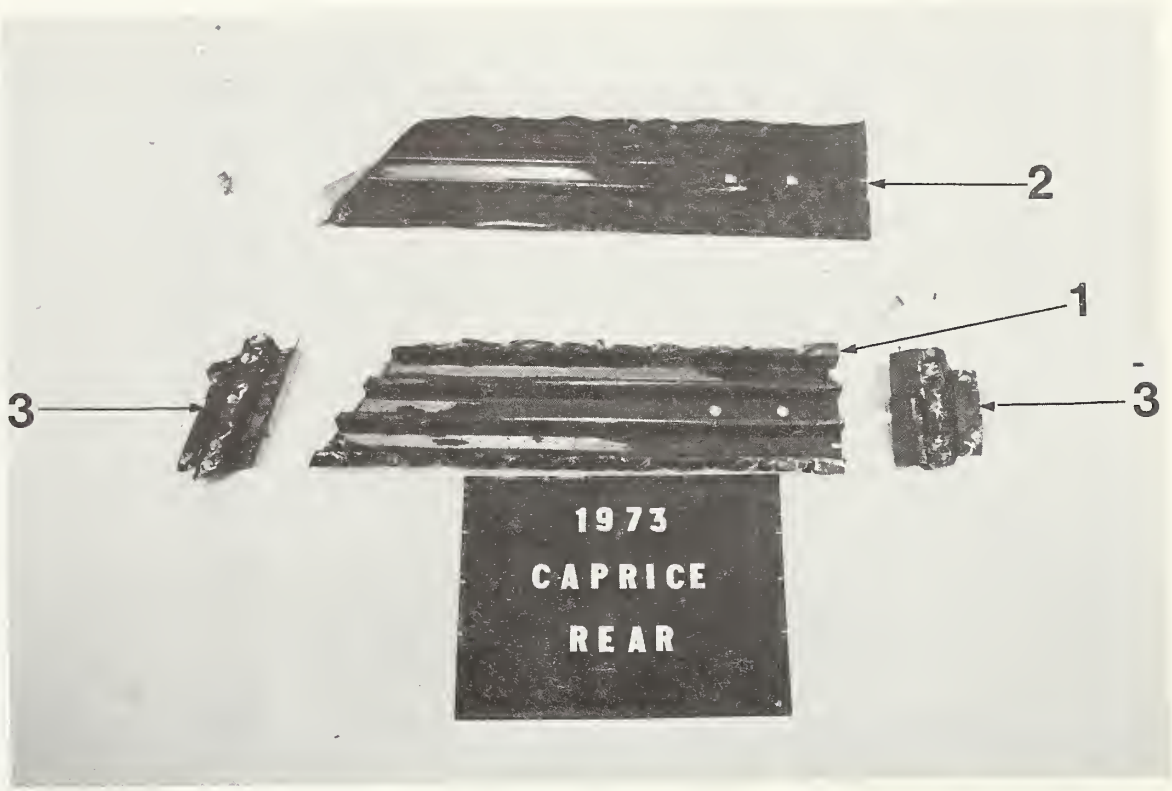
1. FRONT HINGE PILLAR
2. REAR LOCK PILLAR



1973 GM CHEVROLET CAPRICE 4 DOOR
FRONT DOOR
IMPACT BAR ASSY

COMPONENT CODE

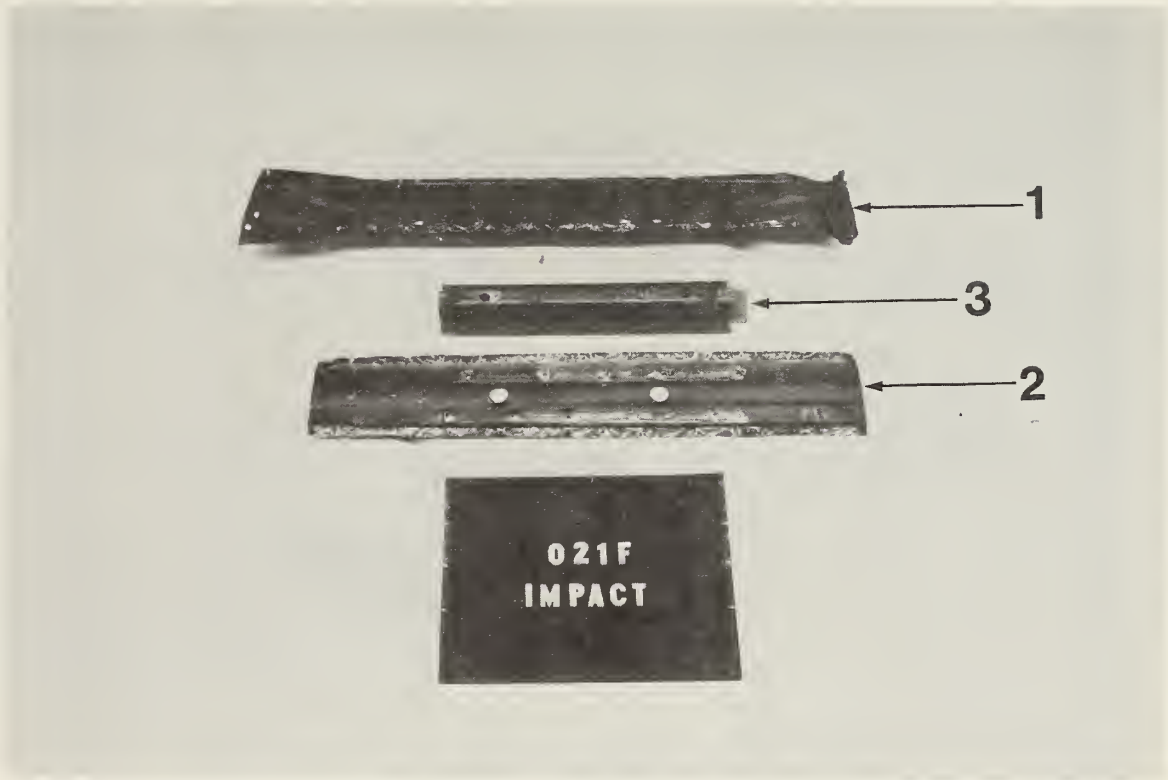
1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR COVER PLATE
4. IMPACT BAR MOUNTING FLANGE



1973 GM CHEVROLET CAPRICE 4 DOOR
REAR DOOR BEAM

COMPONENT CODE

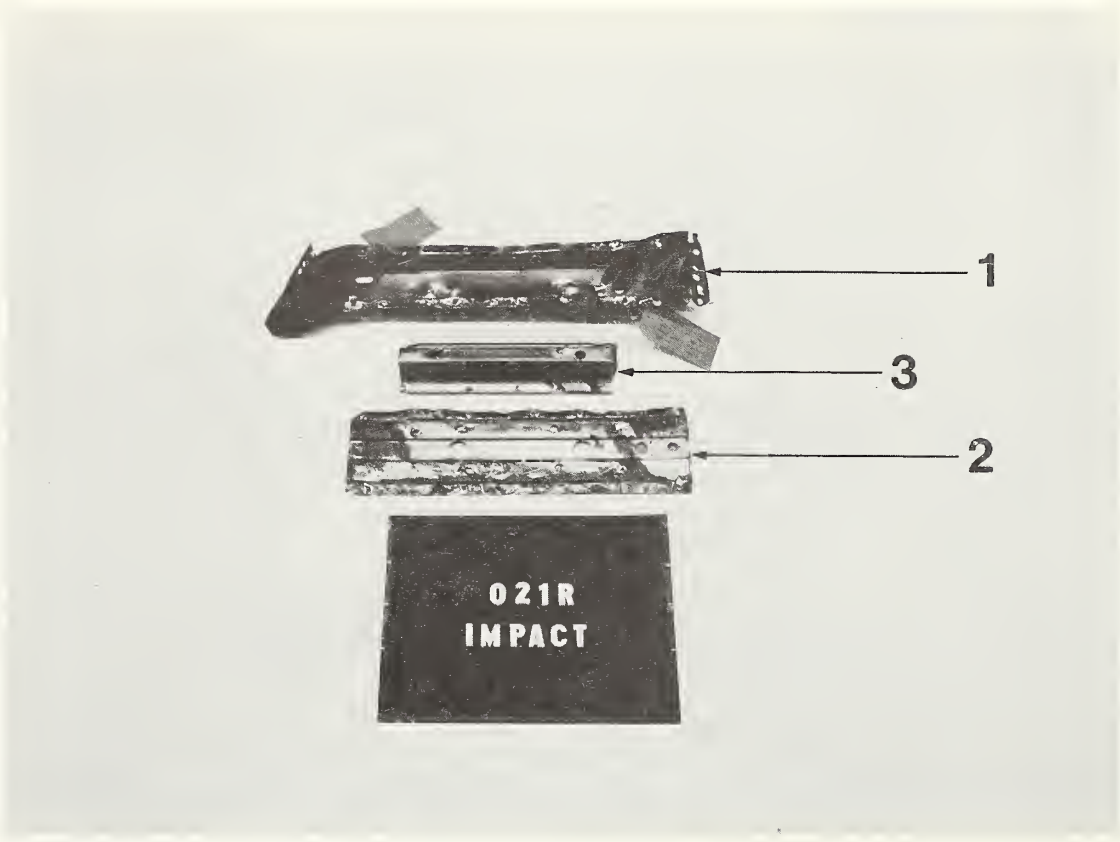
1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR MOUNTING FLANGE



1979 GM CHEVROLET CAPRICE 4 DOOR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER



1979 GM CHEVROLET CAPRICE 4 DOOR
REAR DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER

1973 GM TORONADO 2 DOOR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR MOUNTING FLANGE
4. IMPACT BAR PLATE

1979 GM TORONADO 2 DR
FRONT DOOR BEAM

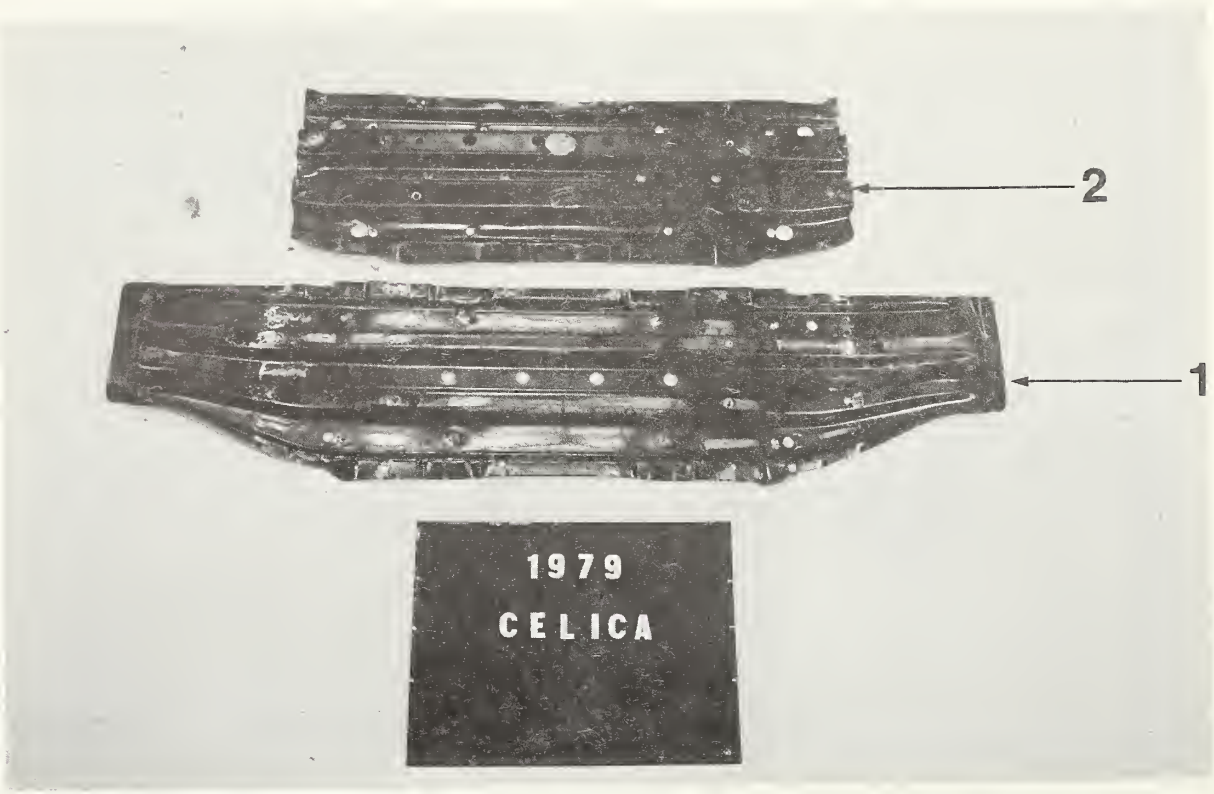
COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR COVER
3. IMPACT BAR STIFFENER

COMPONENT CODE

1. IMPACT BAR

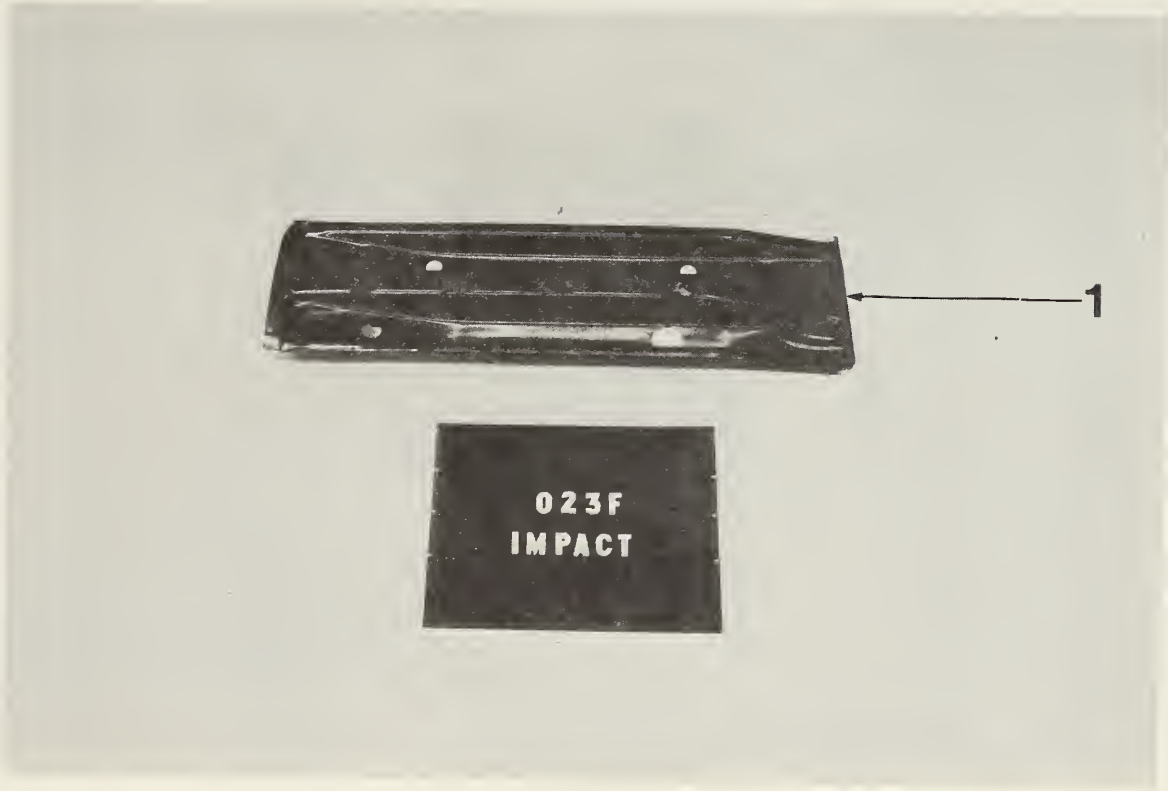
1973 TOYOTA CELICA 2 DOOR
FRONT DOOR BEAM



1979 TOYOTA CELICA 2 DR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR STIFFENER



COMPONENT CODE

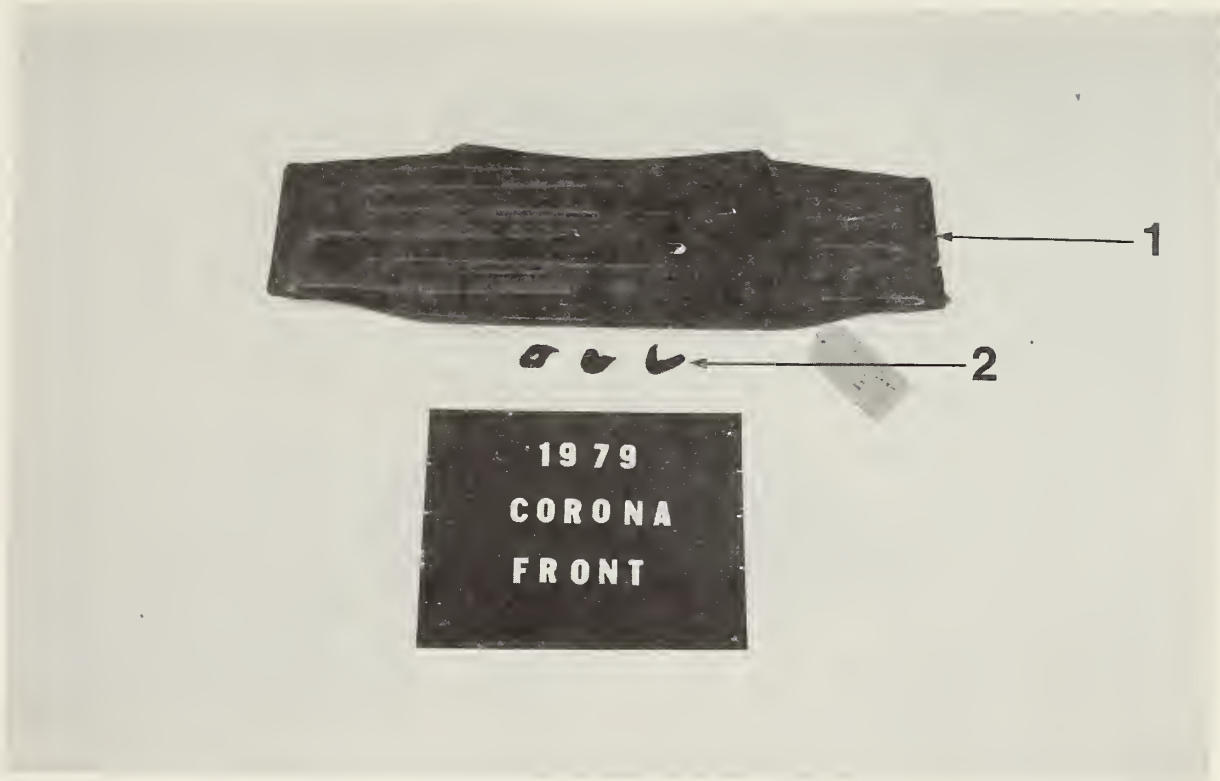
1. IMPACT BAR

1973 TOYOTA CORONA 4 DOOR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR

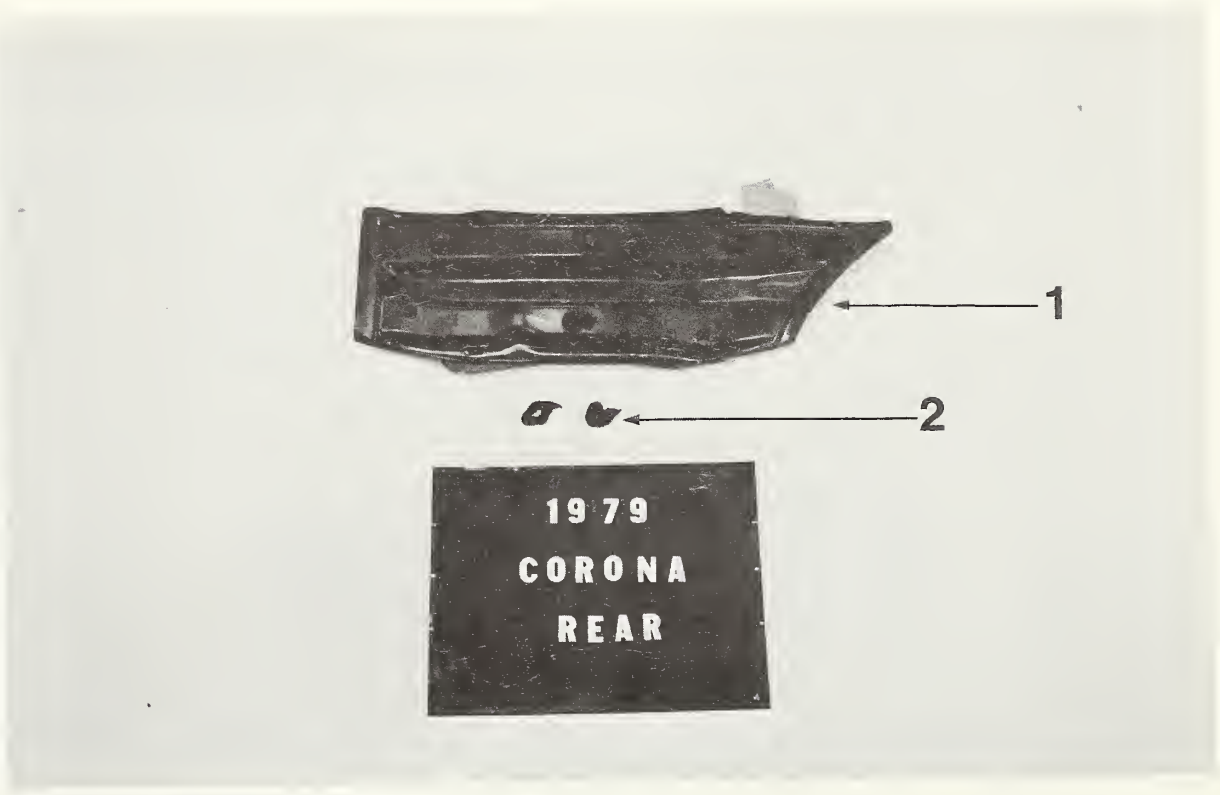
1973 TOYOTA CORONA 4 DOOR
REAR DOOR BEAM



1979 TOYOTA CORONA 4 DOOR
FRONT DOOR
IMPACT BAR ASSY

COMPONENT CODE

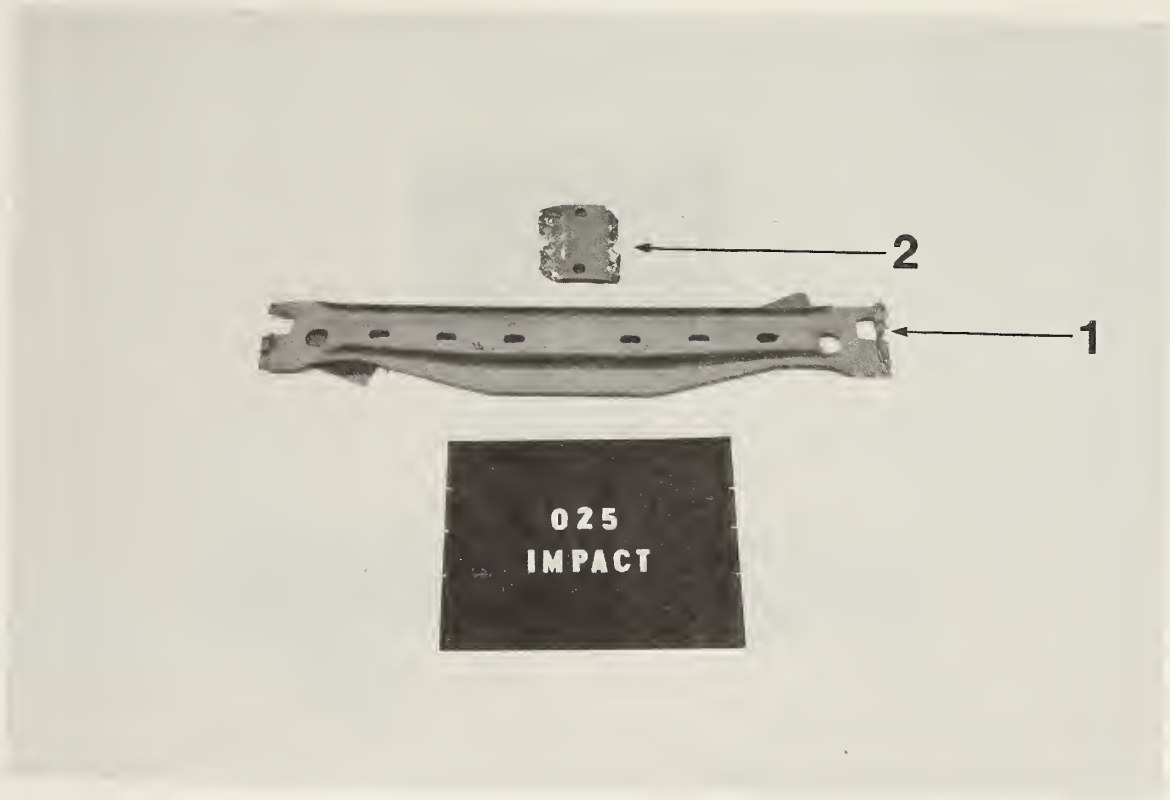
1. IMPACT BAR
2. IMPACT BAR PAD



1979 TOYOTA CORONA 4 DOOR
REAR DOOR
IMPACT BAR ASSY

COMPONENT CODE

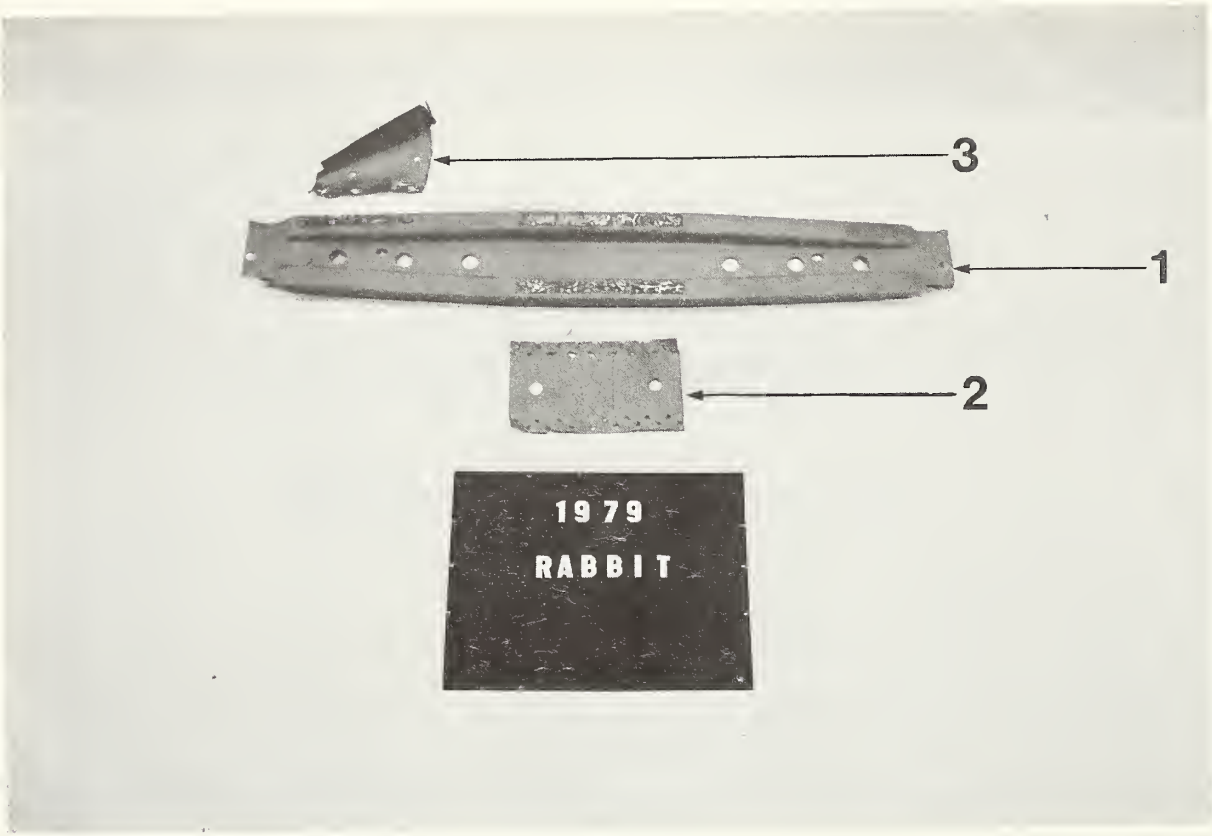
1. IMPACT BAR
2. IMPACT BAR PAD



1973 VOLKSWAGEN BEETLE 2 DOOR
FRONT DOOR BEAM

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR MOUNTING FLANGE



1979 VOLKSWAGEN RABBIT 2 DOOR
IMPACT BAR ASSY

COMPONENT CODE

1. IMPACT BAR
2. IMPACT BAR STIFFENER
3. IMPACT BAR MOUNTING FLANGE